Sara Lee:

Improved Compressed Air System Increases Efficiency and Saves Energy at an Industrial Bakery

Benefits

- Saves $50,000 annually
- Reduces annual energy consumption by 471,000 kWh
- Reduces annual maintenance costs
- Achieves a 6.5-month simple payback

Applications

Compressed air systems are found throughout industry, and they can consume a significant portion of the electricity used by manufacturing plants. Using a system-level strategy to improve a compressed air system is the best way to enhance system performance, increase efficiency, and save energy.

Project Summary

Sara Lee now has a better compressed air system at its industrial bakery in Sacramento, California, because of an energy efficiency project completed in December 2004. Earlier, a pressure/flow controller had failed, causing a substantial decline in the compressed air system's performance. So, plant personnel commissioned Draw Professional Services, a DOE Allied Partner, to evaluate the system. A Qualified AIRMaster+ Specialist and instructor at Draw, Frank Moskowitz, used the AirMaster+ software tool to assess the system; this included an evaluation of the compressed air requirements as well as the effective use of the available supply. The evaluation resulted in a system-level strategy for improvements that involved repairing the pressure/flow controller, fixing compressor controls, repairing leaks, and replacing a 150-horsepower (hp) compressor with a 100-hp unit fitted with a variable-speed drive (VSD). The resulting project greatly increased the compressed air system's efficiency and performance while reducing the bakery's annual energy and maintenance costs for compressed air.

Plant/Project Background

Sara Lee Bakery Group, a division of Sara Lee Corporation, prepares and markets a full line of branded, packaged baked goods in the United States, Europe, and Australia. The Sacramento facility is a 300,000-square-foot industrial bakery built in 1929. With 450 full-time employees, it operates a high-speed bread and bun line seven days per week. Compressed air is an important element that directly supports the stacking, blowing, and cleaning operations required by the bread-making machines.

Before the project, one 100-hp and two 150-hp rotary screw compressors served the bakery's compressed air system. After a pressure/flow controller failed, air demand patterns began fluctuating severely, and staff had to operate all three compressors simultaneously to meet production targets. In addition, the compressor controls were out of adjustment; this caused them to react to different control pressures, so more than one compressor would activate when only one unit was actually needed. Compressed air leaks accounted for 15% to 20% of the system's demand, and uncontrolled open blowing applications were found. Those two conditions exacerbated the pressure fluctuations and wasted even more compressed air.

After the project, however, the system's performance improved considerably. The plant now has a consistent air supply and stable pressure, and fewer compressors are needed to meet the air demand.

The 100-hp fixed-speed compressor is now the base unit, and the 100-hp VSD unit is the trim compressor. Plant staff were able to dispose of one of the two 150-hp compressors; the remaining one serves as a backup.

Project Results

The compressed air system project at the Sara Lee Bakery is yielding impressive energy savings while making production more reliable. Measurements taken after the project was completed indicate energy savings of 471,000 kWh and cost savings of $40,000 per year. These figures are consistent with AIRMaster+ estimates. Also, because two compressors can be off-line, maintenance costs have declined, saving another $10,000 per year, for a total annual savings of $50,000. An $11,000 rebate from the Sacramento Municipal Utility District reduced the total project costs to $27,000, for a simple payback of 6.5 months.

Lesson Learned

Inoperative and improperly functioning components can reduce compressed air system performance, leading to higher energy and maintenance costs. Using a system-level approach to repairing or replacing malfunctioning components is the best way to optimize system efficiency, reduce energy consumption, and ensure reliable production. At Sara Lee's Sacramento bakery, a misadjusted compressor controls package and a failed pressure/flow controller caused the compressed air system's performance to be erratic and increased energy and maintenance costs. A system-level assessment that included an AIRMaster+ analysis resulted in a comprehensive project to achieve greater efficiency and improve the system's performance.

Frank Moskowitz

Partner Profile

Frank Moskowitz is a mechanical engineer with more than 30 years of experience in industrial plant engineering. He has worked with Draw Professional Services, a DOE Allied Partner, for 16 years and has audited hundreds of compressed air systems throughout North America in a variety of manufacturing plants. He has published articles in *Plant Engineering magazine*, *MRO Today* and *Energy Matters*, and has presented hundreds of seminars throughout the industry. In addition, he is a qualified instructor for both Fundamentals and Advanced Compressed Air Challenge (www.compressedairchallenge.org) training and a DOE Senior AIRMaster+ instructor.

Project Partners

Sara Lee, Inc.
Sacramento, CA

Draw Professional Services
Cave Creek, AZ

Sacramento Municipal Utility District
Sacramento, CA

Qualified Specialists

Qualified Specialists are industry professionals who identify cost-cutting and efficiency opportunities in industrial plants. Experienced professionals who complete a qualification training workshop and exam for specific DOE-developed software tools receive special designations, and they can use these tools to help plants reduce costs, decrease maintenance and downtime, and improve productivity. The training recognizes and enhances a professional's expertise in the use of DOE's AIRMaster+ software tool, Pumping System Assessment Tool, Process Heating Assessment and Survey Tool, or Steam System Tools.

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